The association between the Gender-Equitable Men Scale and Injection Risk Behaviors in Appalachian Ohio

Honors Research Thesis

Presented in Partial Fulfillment of the Requirements for graduation

"with Honors Research Distinction in Public Health"

In the undergraduate colleges of The Ohio State University

by

Abigail Rinderle

The Ohio State University

April 2020

Project Advisor: Dr. Kathryn Lancaster, College of Public Health

Committee Member: Dr. William Miller, College of Public Health

Abstract

Objectives: To assess levels of gender-inequitable norms among people who inject drugs (PWID) in rural Ohio and how respective Gender-Equitable Men Scale (GEMS) scores correlate to injection risk behaviors.

Methods: Cross-sectional data from the Ohio Opioid Project was used in this study, which had GEMS questions embedded. A question regarding the number of times a participant shared a syringe in the last month was used as a proxy for injection risk behavior.

Results: Poisson regression models revealed that overall GEMS scores did not have an effect on syringe sharing behavior. Chi-squared tests did indicate lower levels of inequity than were assumed in Appalachian Ohio, though women were more likely to approve of violence and men were more likely to disapprove of homosexuality.

Conclusions: Gender norms play an important role in the cultural acceptability of violence, which could influence injection practices in rural Ohio. The deeper reasons why must be understood in order to address disparities in injection risk behaviors.

I. Introduction

Hepatitis C (HCV) is a virus that is spread via blood or bodily fluids that contain blood.[1,2] The most common route of transmission in the United States is injection drug use, followed by vertical transmission, sex with a HCV-seropositive person, accidental needlesticks, and receipt of tainted blood products.[2] HCV occurs as an acute infection in

about 20% of cases, meaning the body eventually clears the virus on its own.[3,4] However, in the vast majority of cases, HCV is a chronic, life-long disease.

HCV rates have increased across the United States as a result of the opioid epidemic. In Ohio, often considered the epicenter of the opioid epidemic, acute HCV cases increased 1,000% between the years 2011 and 2015.[5] Southern Ohio is home to the worst rates of HCV in the state: 463.4 cases per 100,000 people in Pike county, 382.8 in Lawrence County, and 374.6 in Scioto County. For reference, the rate for the state of Ohio as a whole is 188.4 per 100,000 people.[6]

Because the human immunodeficiency virus (HIV) is transmitted in many of the same ways that HCV is transmitted, studies examining HIV risk and injection drug use are often applicable to understanding HCV risk.[7] A link between gender and bloodborne disease incidence and prevalence has been reported by many studies, particularly with both HIV and HCV.[8–17] Many risk behaviors have been identified that may account for these discrepancies. For example, gender seems to play a significant role in forming a woman's first injection experience.[18,19] Friends and partners have a more profound influence on women's decision to begin injecting when compared to men. When women require help injecting themselves or when someone else injects for them, their HIV risk is significantly higher than women who inject themselves.[20,21] Additionally, women's risk for HIV and HCV is elevated when their supply of drugs or injecting supplies such as cookers and cotton is controlled or monitored by a partner.[11–13,22] Research has also examined possible confounding factors that may influence HCV risk, and it has been found that planning ability is not to blame, but overlap between sex and drug networks

may be involved.[23,24] When HCV risk as a whole is examined among people who inject drugs (PWID), gender is an independent predictor of exposure to HCV.[8–10,25]

While much research has been done in order to identify women's increased risk for HCV, more investigation is needed to discover why. There is certainly an entire web of complex social, political, and biological factors that has formed to negatively impact women, but the root cause must be identified. The overall objective of this research was to examine the relationship between personal and societal gender norms and injection risk behaviors. It has already been shown that gender is an independent predictor of exposure to HCV, but observing gender norms and risk behaviors together may give insight into why this is. Quantifying something as intangible as gender norms is not often done. But doing so allows us to see connections that may not have been visible before, and will subsequently allow us to design interventions with greater sociological and anthropological competency.

II. Background

a. Gender-Equitable Men Scale

Evaluating gender norms is often a subjective process. The Gender-Equitable Men Scale allows for a more objective process. Considering the contradictory results of previous studies in Appalachia, an investigation via a new method is warranted in order to help address the ongoing opioid epidemic. The Gender-Equitable Men Scale, originally developed by the Population Council to help measure HIV risk, shows promise.[26] The GEMS reliability has been proven in multiple studies in several regions of the world.[27,28] The GEMS has been used in

many countries, including Tanzania, India, Kenya, Bosnia and Herzegovina, Brazil, Democratic Republic of the Congo, Mexico, and Rwanda.[27–30] It has been used in a limited capacity in the United States, mostly in California, but to the best knowledge of this research team it has never been used in a rural setting in the United States.

The GEM Scale consists of a number of statements which are either labeled "gender-equitable" or "gender-inequitable." Participants read each statement, and then answer with either "agree," "partially agree," or "do not agree." These ordered categorical variables can then be assigned a point value, with can then be coded to represent equity. For example, for a gender-inequitable statement such as "it is a woman's responsibility to avoid getting pregnant," a response of "agree" would be equal to 2 points and "do not agree" would be equal to 0 points. Alternatively, for a gender-equitable statement such as, "in my opinion, a woman can suggest using condoms just like a man can", the values would be reverse-coded so that "agree" would be equal to 0 points and "do not agree" would be equal to 2 points. The values can them be summed to provide an overall GEM score.[26,28] The higher the overall score, the less equitable a person's gender norms are.

The original GEM scale, developed by Pulerwitz et al. in 2007, aimed to draw from five specific domains of gender norms, selected after qualitative research and literature reviews. Additionally, the first GEM scale was solely meant for young men in Brazil. The domains were: 1) domestic work and caring

for children, 2) sexuality and sexual relationships, 3) reproductive health and disease prevention, 4) intimate partner violence, and finally, 5) homosexuality and close relationships with other men.[28] The scale has since been used in many other countries and has included women, with reliable results.[31] Pulerwitz et al., 2019 re-worked the five domains into four for use in South Africa. These domains were: 1) norms condoning men's violence and control over women, 2) norms around men as the decision-maker in a couple, 3) norms around men's toughness and avoidance of help-seeking, and 4). Norms around women's primary responsibility as family caretaker.[31]

b. Ohio Opioid Project

The Ohio Opioid Project (OHOP) is a part of the National Rural Opioid Initiative and is currently being conducted by researchers at the Ohio State University. This multi-year, multi-site study aims to understand community and stakeholder perspectives of injection drug use and map and surveille drug policy. OHOP began recruiting participants for IDIs in June of 2018. To be considered eligible for the study, participants had to be residents of Scioto, Pike, or Jackson counties and have injected drugs within the 30 days prior to their interview or used opioids in any form. A portion of those interviewed would be women with young children who had experience with Neonatal Abstinence Syndrome, and a portion would be people who had recently transitioned to injection drug use within the past year.

III. Methods

a. Data collection

OHOP data used in this analysis were collected from March through November 2019. Participants came from all three eligible counties: Scioto, Pike, and Jackson. Data analysis began in January 2020.

OHOP participants were required to complete a survey upon enrollment that asked about demographics, drug use, injection risk behavior, sexual risk behavior, substance use disorder treatment, and attitudes around issues such as gender equity. A short series of six GEMS questions were built into this initial participant survey, all of which were considered "gender inequitable." The exact wording and response options for the GEMS statements is available in table 1. Because each statement on the OHOP survey is gender inequitable, there was no need for reverse-coding for the gender equitable statements.

As previously mentioned, the past GEMS have drawn from domains commonly observed around gender norms. The GEMS questions embedded in the OHOP survey correspond to the domains outlined in Pulerwitz et al., 2007 because the 2019 paper had not been published when the OHOP survey was developed. The domain that each question belongs to can be seen in table 1, in the far-right column.

Table 1: Embedded GEMS statements in OHOP initial survey

Number	Statement	Response Choices	Domain
1	A woman should tolerate violence in order to keep her family together.	[0] Do not agree [1] Partially agree [2] Agree	Intimate partner violence
2	A man should have the final word about decisions in his home.	[0] Do not agree [1] Partially agree [2] Agree	Domestic work and caring for children
3	It is a woman's responsibility to avoid getting pregnant.	[0] Do not agree [1] Partially agree [2] Agree	Reproductive health and disease prevention
4	A real man produces a male child.	[0] Do not agree [1] Partially agree [2] Agree	
5	A woman who has sex before she marries does not deserve respect.	[0] Do not agree [1] Partially agree [2] Agree	Sexuality and sexual relationships
6	It disgusts me when I see a man acting like a woman.	[0] Do not agree [1] Partially agree [2] Agree	Homosexuality and close relationships with other men

Exact wording and response options for GEMS statements as written in the OHOP initial survey.

b. Data analysis

Chi-squared statistical tests were run to test the association of gender and GEMS score. Gender was dichotomized, so the three observations that indicated gender as "other" were excluded from the analysis. Both the aggregate GEMS score and individual GEMS statement scores were tested against gender.

Poisson regressions were run to analyze the relationship between gender norms and injection behavior. Negative log binomial regressions were used

initially, but we switched to Poisson in order to fix convergence issues. Aggregate GEMS score was calculated by summing the value of the six individual GEMS questions. A binary GEMS score variable was created by categorizing the scores as being either equal to or below the overall median GEMS score of 2 or greater than the overall median. A second binary GEMS score variable was produced to categorize scores as either being completely equitable or not completely equitable. A score of zero was labeled completely equitable, while a score from 1-12 was labeled not completely equitable. Models were created for injection risk behavior by each individual GEMS statement, the aggregate GEMS score, and both binary GEMS score variables.

IV. Results

a. Study sample summary

Data was received from 261 OHOP participants. Three observations were dropped due to low gender category response in order to preserve the validity of the statistical analyses. Data from 258 participants (n=258) was used in the final analysis. The sample was 50% female, and 74% of the overall sample had at least a high school diploma or GED. The modal age group for this sample was the 25-34 age range, followed by the 35-44 age range.

Table 2: Demographics of OHOP participants as of 3/3/2020

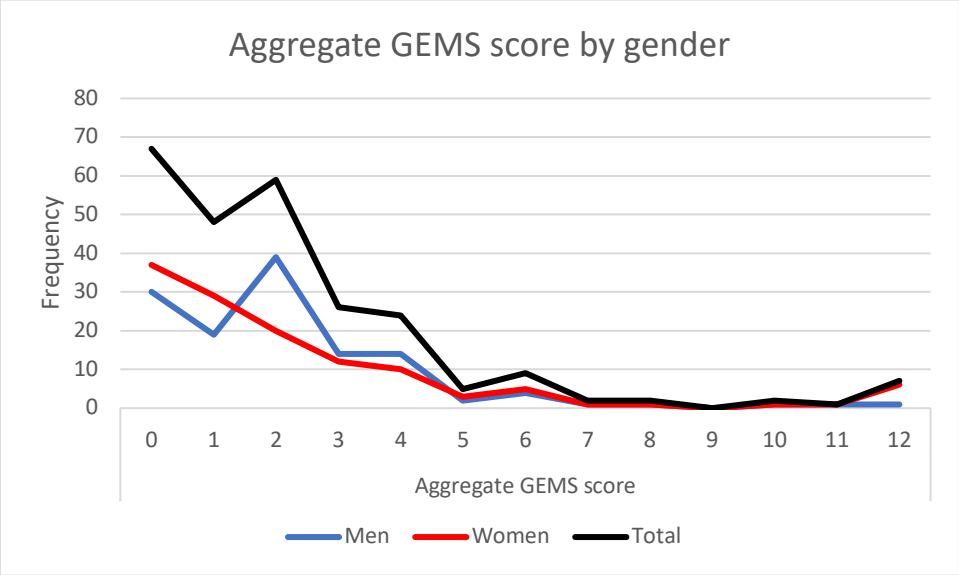
Demographics			
Variable	**Frequency (N)**	**Percent**	**Cumulative Percent**
GENDER			
Female	130	50	50
Male	128	50	100
AGE			
18-24	10	4	4
25-34	84	33	36
35-44	82	32	68
45-54	63	24	93
55-64	17	7	99
65+	2	1	100
EDUCATION			
Less than high school	78	30	44
High school diploma or GED	114	44	89
Some college	46	18	106
Associates degree, trade or technical school	19	7	114
Bachelor degree, other 4 year college degree or more	1	0	114
Total	258	100	100

b. Overall GEMS score by gender

On the cumulative GEMS score range of zero to 12, 12 being the most inequitable and zero being the most equitable, the modal score for men was 2 and the modal score for women was 0. Despite the difference in modal cumulative scores, this was not significant; scores were relatively low for both genders, which may suggest higher overall levels of equitable gender norms in

rural Ohio than previously thought. The modal GEMS score for the sample as a whole was 0. It is worth noting that seven participants had a cumulative GEMS score of 12, six of which were women.

Figure 1: Aggregate GEMS score by gender



Higher scores indicate less equitable gender norms while a score of zero indicates equitable gender norms.

c. Individual GEMS statements

As previously stated, the GEMS statements that were selected for the OHOP initial survey drew from five subsets of questions that focus on specific gender norms.

Individual chi-squared tests showed that women were statistically more likely to agree with the statement, “A woman should tolerate violence in order to keep her family together” (p=0.01). This GEMS statement falls under the domain of, “intimate partner violence”, which may provide more insight into

Appalachian women's commitment to their families rather than their tolerance of violence. Women were also statistically more likely to agree that, "It is a woman's responsibility to avoid getting pregnant" (p=0.01). This statement falls under the domain of, "reproductive health and disease prevention," which could have implications for reproductive health outcomes beyond pregnancy. Additionally, men were statistically more likely to agree that, "It disgusts [them] when [they] see a man acting like a woman" (p=0.02). This statement falls under the domain of "homosexuality and close relationships with other men", which, while certainly indicative of homophobia, may also provide insight into societal pressure to appear traditionally masculine. There were no significant associations between gender and the remaining three individual GEMS statements.

Figure 2: Levels of agreement by gender with GEMS statement 1

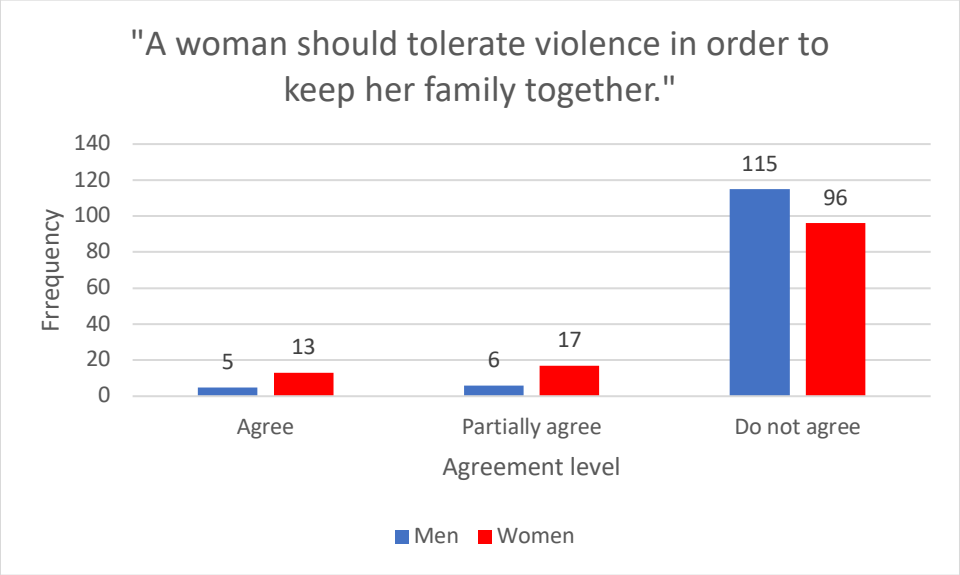


Figure 3: Levels of agreement by gender with GEMS statement 3

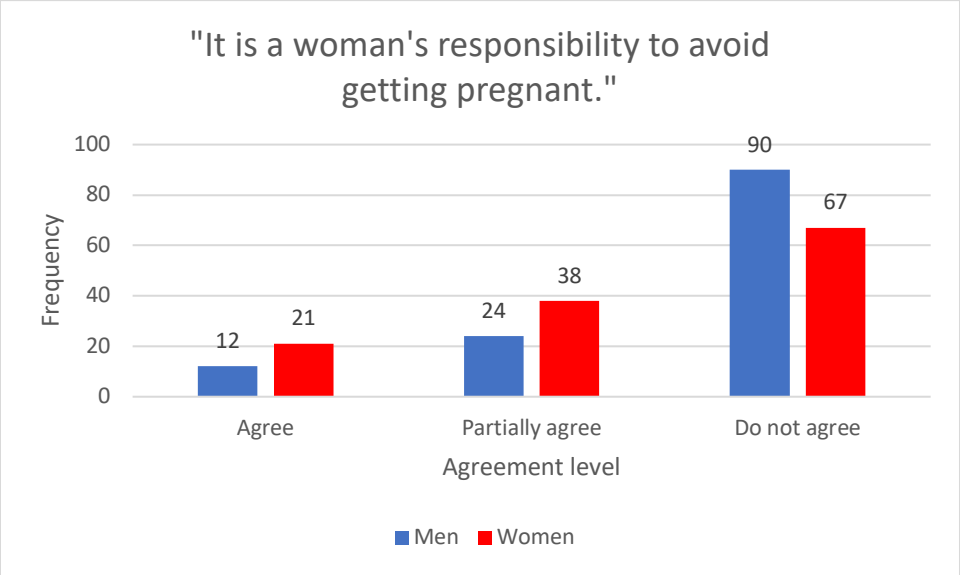
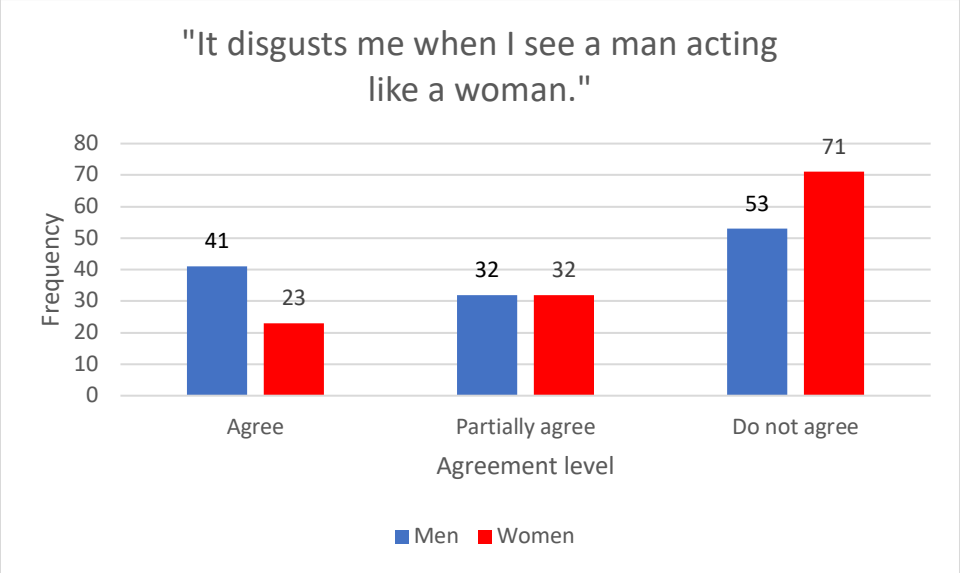


Figure 4: Levels of agreement by gender with GEMS statement 6



d. GEMS score and injection risk behavior

An OHOP question asking the number of times a participant had used a syringe they know was used by someone else in the past 30 days was used to analyze injection risk behavior. Because transmission of HCV or HIV is possible after a single injection with a used syringe, the results were dichotomized into, 0) never sharing syringes in the past 30 days, or 1) sharing at least once in the past 30 days.[32]

The binary injection risk variable was then run in Poisson regression models against GEMS scores with GEMS scores categorized in three separate ways: 1) overall GEMS score, as used in the chi-squared tests, 2) dichotomized into being equal to or less than the median GEMS score of 2 or greater than the median, and 3) a completely equitable score of zero or a score of at least 1.

The covariates of employment status and age were controlled for in final analyses. Employment status is a marker of one's socioeconomic status and personal liberty—both of which may impact injection behavior and gender norms—and was controlled for by dichotomizing participant's major source of income into being either, 1) from a full or part-time job, or 2) from something other than a full or part-time job.[33] Age was also controlled for, as we know that different generations may hold certain beliefs in regards to gender norms, as well as different injection risk behaviors. Age was dichotomized into being equal to or less than the median age of 39 or being above the median age of 39.[34]

In models using the first categorization of the GEMS score, i.e. a scale from zero to 12, the mean estimate for both genders combined was 1.00 (95% CI: 0.59, 1.7). When broken down by gender, the mean estimate for men was 1.49 (95% CI: 0.36, 6.13) and the mean estimate for women was 0.92 (95% CI: 0.54, 1.58). These results are not significant in terms of injection risk behaviors by GEMS scores; however, it is worth noting that the incidence rate ratio for men is higher than that of the women.

When models were run with the other categorizations of GEMS score—dichotomized into being greater than or equal to or less than the mean score, and then dichotomized as being equal to zero or greater than zero—the same trend was observed. The mean estimates were always highest for men and lowest for women, with the overall mean estimates for the genders combined falling in the middle. Full results with the 95% confidence intervals are available in Table 2.

Table 3: Unadjusted and adjusted incidence rate ratios for GEMS statements by gender

		Unadjusted IRR		Adjusted IRR	
		Men	*Women*	*Men*	*Women*
GEMS score					
Original GEMS categorization	i.e., 0-12	1.5; (0.36, 6.3)	0.96; (0.57, 1.62)	1.5; (0.36, 6.13)	0.92; (0.54, 1.58)
Dichotomized GEMS score by median	i.e., 2>=x>2	1.51; (0.9, 2.55)	1.05; (0.62, 1.78)	1.56; (0.92, 2.65)	1.03; (0.6, 1.74)
Dichotomized GEMS score as completely equitable or not	i.e., x=0 or x>0	1.2; (0.63, 2.26)	0.83; (0.49, 1.42)	1.19; (0.63, 2.25)	0.84; (0.49, 1.44)

95% confidence interval. Adjusted for employment status and age.

e. Individual GEMS statements

Poisson regression models were also run to test participant's scores for individual GEMS statements against injection risk behavior. Trends were seen for the first, third, and sixth GEMS statements, referring to violence against women, pregnancy prevention, and homophobia, respectively. Three models were run for each statement, one predicting a GEMS score of "1", one predicting a GEMS score of "2", and one with the GEMS statement dichotomized into either completely equitable (score of 0) or not (score of one or above).

When the first GEMS statement as seen in Table 1 was tested by gender via chi-squared tests, we saw that women were significantly more likely to agree with the statement. When tested against syringe sharing and categorized by gender, a similar—but not significant—trend was seen in the incidence rate ratio (IRR); the IRR for the women was slightly higher than men's IRR in all models.

Similar models were run in reference to the third and sixth GEMS statement, which has to do with views on whose responsibility it is to prevent pregnancies and homophobia, respectively. The exact wording of each statement can be found in Table 1. When comparing participants' GEMS scores for this individual statement by their gender, men were significantly more likely to agree with the sixth statement, while women were more likely to agree with the third. In all of these models, regardless of which way the GEMS score was categorized, the same trend was observed: the IRR for men was slightly higher than the IRR for the women. However, this difference was not significant. The

trend with GEMS statement three is especially interesting and stands out amongst the other GEMS statements; it is specifically asking about opinions on health responsibility. Because women were significantly more likely to agree that pregnancy prevention was their responsibility, it is possible that sense of autonomy could be expressed in injection behaviors, for example, having slightly lower estimated IRR for syringe sharing than men.

V. Discussion

Results from this analysis suggests that, while gender norms may not be completely equitable in Appalachia, the discrepancies may not present themselves in expected ways. Poisson distribution models do not show significant associations between GEMS scores and syringe sharing, but they do reveal interesting patterns in specific gender norm domains. However, chi-squared results did show significant associations between individual GEMS statements and gender.

The original reasoning behind our hypothesis was that PWID with more equitable gender norms may be more aware of injection risk behaviors that could potentially impact their partners' health, whereas PWID with less equitable gender norms may not be as concerned for their partners' health and safety. After analyzing study data, this hypothesis is not supported. GEMS scores were not directly associated with syringe sharing, but when the GEMS was dissected into individual statements, different patterns were visible. This may have something to do with the acceptability and relatability of the statements themselves. For example, the statement, "A real man produces a real child" may still be held in some areas, but the study data suggests that it

is not true in Appalachia Ohio. It is possible that a GEMS scale consisting of different statements may return different results.

Many previous studies have shown that a woman's risk for HCV and other bloodborne diseases is elevated when she requires help injecting from a partner.[20,21] Similar results can be seen when examining who controls injection equipment such as cookers and cotton.[23] In southern Ohio, however, it is possible that those issues may not as big of a barrier as they are in other areas of the county. With the rise of pill mills and the subsequent opioid epidemic having its roots in Appalachia, it is possible that women who inject drugs do not have to rely on male partners to acquire, prepare, and inject substances due to the availability of drugs and their widespread use among both men and women.

In conclusion, while gender norms may not have the anticipated effect on injection risk behaviors as hypothesized at the beginning of this study, there is certainly still something to be learned. As higher levels of gender inequity within gender norms appear to be connected to injection risk behavior in some way, the underlying question of why that is must still be answered. Future research attempting to answer this question may find that gender norms focusing on violence, reproductive responsibility, and homophobia show the clearest associations. However, this study has many limitations. It is important to remember that this sample came entirely from southern Ohio, a region officially designated as Appalachian. Additionally, the GEMS scale is a relatively new measurement tool, and it is likely that many iterations will need to be tried before the most culturally appropriate and accurate version is found. It is worth

noting that the original GEMS scale used abroad consisted of 20+ statements, while the OHOP survey only included six. Additionally, all six of these statements are considered "gender-inequitable." Future research may use different variations of the GEMS scale by including both gender equitable and gender inequitable statements. Additionally, there may be other risk behaviors that display one's gender norms more clearly than syringe sharing does. Future research could consider examining results like overdoses, help injecting, or equipment sharing.

References

1. Division of Viral Hepatitis, National Center for HIV/AIDS, Viral Hepatitis, STD and TP. Hepatitis C Questions and Answers for the Public | CDC. https://www.cdc.gov/hepatitis/hcv/cfaq.htm. Published 2018. Accessed June 27, 2019.
2. Division of Viral Hepatitis. Hepatitis C Information | Division of Viral Hepatitis | CDC. Centers for Disease Control and Prevention. https://www.cdc.gov/hepatitis/hcv/index.htm. Accessed July 2, 2019.
3. World Health Organization. Hepatitis C. https://www.who.int/news-room/fact-sheets/detail/hepatitis-c. Published 2018. Accessed July 2, 2019.
4. Shepard CW, Finelli L, Alter MJ. Global epidemiology of hepatitis C virus infection. *Lancet Infect Dis*. 2005. doi:10.1016/S1473-3099(05)70216-4
5. Ohio Department of Health HSP. *Ohio Hepatitis C Cases*.; 2018. https://odh.ohio.gov/wps/wcm/connect/gov/a85bd075-e2e9-4cd3-bd72-480ea66279b2/2017+HCV+Yearly+Report+.pdf?MOD=AJPERES&CONVERT_TO=url&CACHEID=ROOTWORKSPACE.Z18_M1HGGIK0N0JO00QO9DDDDM3000-a85bd075-e2e9-4cd3-bd72-480ea66279b2-moMEsMS. Accessed June 19, 2019.
6. Ohio Department of Health HSP. Ohio Total Hepatitis C Cases Rates By County. https://odh.ohio.gov/wps/wcm/connect/gov/36f45e2a-50d5-425b-a7ea-03d4558d3b85/2017+HCV+Rate+Map+062618.pdf?MOD=AJPERES&CONVERT_TO=url&CACHEID=ROOTWORKSPACE.Z18_M1HGGIK0N0JO00QO9DDDDM3000-36f45e2a-50d5-425b-a7ea-03d4558d3b85-moMEthl. Published 2018. Accessed July 2, 2019.
7. Division of Viral Hepatitis, National Center for HIV/AIDS, Viral Hepatitis, STD and TP. HIV Transmission | HIV Basics | HIV/AIDS | CDC. https://www.cdc.gov/hiv/basics/transmission.html. Published 2018. Accessed June 27, 2019.
8. Tracy D, Hahn JA, Fuller Lewis C, et al. Higher risk of incident hepatitis C virus among young women who inject drugs compared with young men in association with sexual

relationships: A prospective analysis from the UFO Study cohort. *BMJ Open*. 2014. doi:10.1136/bmjopen-2014-004988
9. Iversen J, Wand H, Gonnermann A, Maher L, collaboration of Australian Needle and Syringe Programs. Gender differences in hepatitis C antibody prevalence and risk behaviours amongst people who inject drugs in Australia 1998–2008. *Int J Drug Policy*. 2010;21(6):471-476. doi:10.1016/j.drugpo.2010.04.004
10. Iversen J, Page K, Madden A, Maher L. HIV, HCV, and Health-Related Harms Among Women Who Inject Drugs: Implications for Prevention and Treatment. *J Acquir Immune Defic Syndr*. 2015;69 Suppl 2(0 1):S176-81. doi:10.1097/QAI.0000000000000659
11. Epele ME. Gender, Violence and HIV: Women's Survival in the Streets. *Cult Med Psychiatry*. 2002;26(1):33-54. doi:10.1023/A:1015237130328
12. Bourgois P, Prince B, Moss A. The Everyday Violence of Hepatitis C Among Young Women Who Inject Drugs in San Francisco. *Hum Organ*. 2004;63(3):253-264. http://www.ncbi.nlm.nih.gov/pubmed/16685288. Accessed June 19, 2019.
13. BARNARD MA. Needle sharing in context: patterns of sharing among men and women injectors and HIV risks. *Addiction*. 1993;88(6):805-812. doi:10.1111/j.1360-0443.1993.tb02094.x
14. Hofmeister MG, Havens JR, Young AM. Silence Surrounding Hepatitis C Status in Risk Relationships Among Rural People Who Use Drugs. *J Prim Prev*. 2017;38(5):481-494. doi:10.1007/s10935-017-0483-6
15. Esmaeili A, Mirzazadeh A, Carter GM, et al. Higher incidence of HCV in females compared to males who inject drugs: A systematic review and meta-analysis. *J Viral Hepat*. 2017. doi:10.1111/jvh.12628
16. Esmaeili A, Mirzazadeh A, Morris MD, et al. The Effect of Female Sex on Hepatitis C Incidence among People Who Inject Drugs: Results from the International Multicohort InC3 Collaborative. *Clin Infect Dis*. 2018. doi:10.1093/cid/cix768
17. Des Jarlais DC, Feelemyer JP, Modi SN, Arasteh K, Hagan H. Are females who inject drugs at higher risk for HIV infection than males who inject drugs: An international systematic review of high seroprevalence areas. *Drug Alcohol Depend*. 2012;124(1-2):95-107. doi:10.1016/j.drugalcdep.2011.12.020
18. Frajzyngier V, Neaigus A, Gyarmathy VA, Miller M, Friedman SR. Gender differences in injection risk behaviors at the first injection episode. *Drug Alcohol Depend*. 2007. doi:10.1016/j.drugalcdep.2006.12.021
19. Young AM, Larian N, Havens JR. Gender differences in circumstances surrounding first injection experience of rural injection drug users in the United States. *Drug Alcohol Depend*. 2014. doi:10.1016/j.drugalcdep.2013.10.013
20. O'Connell JM, Kerr T, Li K, et al. Requiring Help Injecting Independently Predicts Incident HIV Infection Among Injection Drug Users. *JAIDS J Acquir Immune Defic Syndr*. 2005;40(1):83-88. doi:10.1097/01.qai.0000157006.28535.mL
21. Unger JB, Kipke MD, De Rosa CJ, Hyde J, Ritt-Olson A, Montgomery S. Needle-sharing among young IV drug users and their social network members: The influence of the injection partner's characteristics on HIV risk behavior. *Addict Behav*. 2006;31(9):1607-1618. doi:10.1016/J.ADDBEH.2005.12.007
22. Sherman SG, Latkin CA, Gielen AC. SOCIAL FACTORS RELATED TO SYRINGE SHARING

AMONG INJECTING PARTNERS: A FOCUS ON GENDER. *Subst Use Misuse*. 2001;36(14):2113-2136. doi:10.1081/JA-100108439

23. Scheidell JD, Khan MR, Clifford LM, Dunne EM, Keen LD, Latimer WW. Gender differences in planning ability and hepatitis C virus among people who inject drugs. *Addict Behav*. 2015. doi:10.1016/j.addbeh.2015.03.019
24. Latkin CA, Mandell W, Knowlton AR, et al. Gender differences in injection-related behaviors among injection drug users in Baltimore, Maryland. *AIDS Educ Prev*. 1998.
25. Miller CL, Wood E, Spittal PM, et al. The future face of coinfection: prevalence and incidence of HIV and hepatitis C virus coinfection among young injection drug users. *J Acquir Immune Defic Syndr*. 2004;36(2):743-749. http://www.ncbi.nlm.nih.gov/pubmed/15167294. Accessed June 19, 2019.
26. Singh, A.K., Verma, R., Barker G. *Measuring Gender Attitude: Using Gender-Equitable Men Scale (GEMS) in Various Socio-Cultural Settings | Promundo*.; 2013. https://promundoglobal.org/resources/measuring-gender-attitude-using-gender-equitable-men-scale-gems-in-various-socio-cultural-settings/. Accessed June 19, 2019.
27. Shattuck D, Burke H, Ramirez C, et al. Using the Inequitable Gender Norms Scale and Associated HIV Risk Behaviors among Men at High Risk for HIV in Ghana and Tanzania. *Men Masc*. 2013;16(5):540-559. doi:10.1177/1097184X13502730
28. Pulerwitz J, Barker G. Measuring Attitudes toward Gender Norms among Young Men in Brazil Development and Psychometric Evaluation of the GEM Scale. 2008;10:322-338. doi:10.1177/1097184X06298778
29. Fleming PJ, McCleary-Sills J, Morton M, Levtov R, Heilman B, Barker G. Risk Factors for Men's Lifetime Perpetration of Physical Violence against Intimate Partners: Results from the International Men and Gender Equality Survey (IMAGES) in Eight Countries. Dalal K, ed. *PLoS One*. 2015;10(3):e0118639. doi:10.1371/journal.pone.0118639
30. Verma RK, Pulerwitz J, Mahendra V, et al. Challenging and Changing Gender Attitudes among Young Men in Mumbai, India. *Reprod Health Matters*. 2006;14(28):135-143. doi:10.1016/S0968-8080(06)28261-2
31. Pulerwitz J, Gottert A, Kahn K, et al. Gender Norms and HIV Testing/Treatment Uptake: Evidence from a Large Population-Based Sample in South Africa. *AIDS Behav*. July 2019. doi:10.1007/s10461-019-02603-8
32. Havens JR, Lofwall MR, Frost SDW, Oser CB, Leukefeld CG, Crosby RA. Individual and network factors associated with prevalent hepatitis C infection among rural appalachian injection drug users. *Am J Public Health*. 2013. doi:10.2105/AJPH.2012.300874
33. Galobardes B, Lynch J, Smith GD. Measuring socioeconomic position in health research. doi:10.1093/bmb/ldm001
34. Cichy KE, Lefkowitz ES, Fingerman KL. Generational differences in gender attitudes between parents and grown offspring. *Sex Roles*. 2007;57(11-12):825-836. doi:10.1007/s11199-007-9314-1